

The greatest difference between the value of M determined by observation on any one tube and the mean is 15.5 parts in one million, while the greatest change that has taken place in the value of any one of the manganin standards of the first division relative to the tubes is 45 parts in one million.

Dr. Scheel has an interesting paper on the expansion of solids, describing a series of experiments using the Pulfrich form of the Fizeau dilatometer. The method leads to results of great accuracy for expansions at temperatures up to that of the boiling point of water; it is interesting to note that for Berlin porcelain, the expansion of which is of importance in connection with its use in the air thermometer, the author confirms the result of Chappuis and Harker. Holborn and Gruneisen had found that at high temperatures, say 600° C., the expansion is much less than would be inferred from a formula extending over a range from 0° C. to 100° C. In this respect the porcelain resembles fused quartz.

In another paper Lummer and Gehrcke discuss in a very complete manner the optical properties of dispersion apparatus of high resolving power, while reference must be made to two papers, on the scattering of particles from heated metallic surfaces, especially those of the platinum group, and on the scattering of particles from kathode surfaces in a vacuum.

It is clear from this brief notice that the range covered is a wide one, and that the Reichsanstalt is still continuing to advance our knowledge in a notable degree.

#### RECENT GEOLOGICAL OBSERVATIONS IN CAPE COLONY.<sup>1</sup>

WHEN Dr. Edward Brown, in 1669, carried the fame of the Royal Society across Europe, and quietly pursued his antiquarian inquiries, he remarked that there were "Wars at that time when I was in this Country, between the Elector Palatine and the Duke of Lorraine." In a similar spirit, the geologists of the Cape Commission have continued their conscientious work in a land divided and subdivided against itself, merely transferring their activity to the Transkeian Territories, when geological observation became incompatible "with the necessities of Martial Law" (1901 report, p. 4). The course of a struggle which at one time threatened the Empire is referred to as "the military problem"; the serene permanence of scientific work has seldom been more aptly illustrated.

The region to which the assistant geologists were temporarily exiled lay on the south-east coast of Cape Colony, between the Great Kei River and the frontier of Natal, in native territories where military rule was not proclaimed. In the spring of 1901, however, observations had been rendered possible nearer headquarters, in the divisions of Swellendam and Riversdale. These led to some corrections of the map issued in 1897. Messrs. Rogers and Schwarz point out how the possibly Cretaceous Uitenhage series can often be distinguished from the overlying gravels only by the occurrence of fragments of a quartzite in the latter. This quartzite is a well marked rock that caps the Uitenhage series unconformably.

The same authors, who then formed the field-staff of the survey, describe the general features of the lands examined beyond the Skei. Unlike the western portion of the Colony, there are here no folded moun-

tains near the coast, and the moisture-laden air from the sea penetrates in consequence far inland. The rivers come down from the Storm Bergen and Drakensberg ranges, and cut steep valleys through the vast steps formed by successively elevated "coastal plains." From the coast inwards, we may move along the edge of the same stratum, on the line of strike of a great synclinal. Starting from its axis, about the mouth of the Kei River, older and older beds are met with as we go north-east. In Kentani, the first division, the igneous intrusive masses are so abundant as to obscure the stratified deposits of Karroo age, and seem (p. 31) to have eaten up the latter in making a place for themselves in the crust. The variations from dolerite to granite appear to have originated in a single magma. On nearing Pondoland, the Dwyka Conglomerate, of Lower Karroo age, and always important as a lithological horizon, occurs with its characteristic glaciated boulders. The Table Mountain Sandstone of the Cape system comes out uncrumpled from beneath it. The most interesting work done in Pondoland was the more detailed examination of the Cretaceous beds, already brought to notice by Baily and Garden in 1855, and by Griesbach in 1871. The lower layers contain rolled chelonian bones, and were deposited in shallow water. Among the "superficial," or post-Cretaceous, beds of Kentani is (p. 66) a fossiliferous quartzite of fresh-water origin.

The report for 1902 sees Mr. Rogers installed as acting or chief geologist in place of Dr. Corstorphine, who has been tempted northwards. Mr. A. L. du Toit, himself a colonial, as we are happy to observe, joins the staff as an assistant. The main work for 1902 lay in Matatiele, up against the Drakensberg Range, and still in native territories. The intimate connection of volcanic energy with the range is shown by the discovery of a chain of nineteen vents, in addition to five recorded to the south-west by Mr. Dunn as far back as 1878. They are filled with dolerite or agglomerate, the latter consisting largely of blown-up sedimentary material. The lavas that flowed from them, in Jurassic times, over the upper beds of the Karroo system, have been weathered away on the south-east, but are preserved upon the north-west slope. Mr. Schwarz points out (report for 1902, pp. 51 and 60) how the trend of the volcanic line is related to persistent north-east and south-west axes of folding, which have determined in the past the coast-line of this part of Africa. The old eastern continent had receded, by Jurassic times, as far as the line of volcanic vents; a later uplift must have been followed by subsidence, whereby the present Transkeian coast-line was determined. The edge of the Drakensberg plateau may thus be regarded as the crest of a uniclinal fold, the native territories lying on the lower limb.

The strata encountered range down from the "Cave Sandstone," which may be partly of explosive origin, to permo-Carboniferous beds. All these are included in the convenient but too comprehensive Karroo system (p. 103), though the upper zones may be as modern as the Jurassic period. Indications of reptilian remains are already known (p. 32). The "Molteno beds," more recent than the famous Theriodont horizons of the Karroo system, contain thin coals and oil shales. The natives at present use ox-droppings for fuel, and thus deprive the poor soil of a valuable fertilising agent.

Work was also done in the typical Karroo district, south of the Nieuweveld escarpment, where new discoveries of *Pareiasaurus* have resulted. Considerable pains have been taken to place the collections of the Commission in the hands of specialists for determin-

<sup>1</sup> Cape of Good Hope. Department of Agriculture. Annual Reports of the Geological Commission for 1901 and 1902. (Cape Town: Cape Times Ltd., Government Printers, 1902 and 1903 respectively.)

ation, and no one who has seen the development of the reptilian material from its matrix under the care of Prof. H. G. Seeley can regret that certain specimens, at any rate, have travelled across the sea to England.

G. A. J. C.

### THE CLIMATE OF SOUTH AMERICA.<sup>1</sup>

IN the volume mentioned below, all the mean values of the meteorological elements which constitute the climate of the country in question are brought together, these values being deduced from a long series of observations terminating with the year 1900. When it is mentioned that the country embraces 33° of latitude, the surface of which slopes from the shores of the Atlantic on the east to the snow-clad summits of the central range of the Andes on the west, the reader must not be surprised if he finds great differences in the atmospheric conditions that prevail in the various parts of the Republic.

A thorough knowledge of the changes in the meteorological elements in this the South American portion of the globe will prove of great importance to us dwellers in the Old World, for although we are separated so widely as regards distance, we are intimately connected meteorologically. It is quite within the bounds of possibility that our great dependency India and the region about it (and indirectly the British Isles and Europe generally) may be able to check their long period forecasts on observations made in the Argentine Republic.

In this volume an English translation accompanies the Spanish text, so that the book is available to those who cannot read the latter language. In addition to the numerous tables showing the mean daily and annual variations of the elements, accompanied by an excellent statement in each case, Prof. Davis has given a set of twenty-six plates which illustrate graphically not only these variations, but the mean conditions which prevail over this extensive area.

For many of the elements the monthly and yearly values for each year since the commencement of observation are included, but an omission is made in the case of atmospheric pressure. Recent investigations have indicated that the variations from year to year over the South American continent, more especially about the region of Cordoba, are the inverse of those about the region surrounding the Indian Ocean, that is, when the mean pressure for the year is high in Cordoba it is low in India; the insertion of the pressure values in this volume for one station, namely, Cordoba, would have been very useful.

For climatological reasons it is necessary to study the readings of many barometers well scattered over a country, hence the statement on p. 45 that "observations of atmospheric pressure, however complete, are of little practical value if confined to a single place. . . ." It is important, however, to bear in mind that complete series of barometric observations at two stations, one set to check the other, are quite sufficient in many parts of the world to study the changes over large areas from year to year.

The publication of this volume will undoubtedly be welcomed by meteorologists and those who wish to make themselves acquainted with the weather of the region surveyed, and the very complete manner in which the information has been brought together in this convenient form should add to its usefulness.

W. J. S. L.

<sup>1</sup> "Climate of the Argentine Republic." Compiled from Observations made to the end of the Year 1900. By Walter G. Davis, Director of the Argentine Meteorological Office. Pp. 154; 26 plates. (Published by the Ministry of Agriculture.)

### NOTES.

A CIRCULAR signed by Prof. A. Tonelli and Prof. V. Cerruti announces that it is proposed to erect a memorial in honour of the late Prof. Luigi Cremona, professor of higher geometry in the University of Rome, and director of the engineering school. The fame of Prof. Cremona is world-wide, and his works have exercised a great influence on research in fields of pure and applied mathematics. It is intended that the monument to his memory shall be an international one; and the hope is expressed that all who have been inspired by his discoveries, or have regard for his genius, will contribute to the fund being raised. Subscriptions should be sent to Signor I. Sonzogno Piazza San Pietro in Vincoli, 5, Rome.

At a meeting of the Bath Town Council on Tuesday, mention was made of the fact that helium has been found in gases from the largest and perhaps the best known of the city's hot mineral springs, the King's Bath. The deposits that collect in the tanks and pipes at the three springs have also been investigated. A few weeks ago a quantity of the deposit from the new Royal spring was obtained and sent to the Hon. R. J. Strutt, who, in a communication to the Baths Committee, remarks:—"My experiments have led to some conclusions which may, I hope, interest the committee. I have found that the deposit contains radium in appreciable quantities, though I am sorry to say not enough to pay for extraction. It will be remembered that the gas which bubbles up from the springs contains a small proportion of helium. Sir William Ramsay has recently made the most important discovery that radium slowly evolves helium by a spontaneous change. I think there can be little doubt that the helium of Bath owes its origin to large quantities of radium at a great depth below the earth's surface. A little of this radium is carried up by the rush of hot water and is found in the deposit. My experiments promise further interesting developments, which I shall have much pleasure in bringing to the notice of the committee in due course."

A MEETING was held in the house of the Zoological Society on Tuesday to consider proposals for the organisation of zoologists. Forty-one zoologists from England, Scotland and Ireland attended the meeting. The following resolution was carried by a large majority:—"That it is desirable that the zoologists of Great Britain and Ireland be organised for the consideration of all matters affecting the interests of zoology and zoologists, and to take such action as may seem desirable." A committee consisting of Prof. Cossar Ewart, Prof. Bridge, Prof. Hickson, Dr. Scharff, Dr. G. C. Bourne, Dr. Ridewood, and Mr. Cunningham was appointed to draw up a scheme.

WE are glad to see among the New Year honours gazetted by the India Office the name of Dr. W. T. Blanford, F.R.S., who has been made a Companion of the Order of the Indian Empire. Dr. Blanford, whose services to Indian geology and zoology are known to all our readers, joined the Geological Survey shortly before the outbreak of the mutiny, and is one of the few civilians entitled to wear a Mutiny medal.

ON New Year's Day we had the pleasure of inspecting a series of the well-known animal photographs of the Messrs. Kearton now being exhibited to the public at 175 Bond Street. All these reproductions from the original photographs have been considerably enlarged, although not to such an extent as to impair the sharpness or blur the